EARNED VALUE MANAGEMENT PLAN

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in Cooperation with

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Document Control Sheet

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Ver	Date	Description	Originator
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1 Introduction

1.1 Document Purpose

The purpose of this document is to describe the OOI Earned Value Management System (EVMS) and how through the OOI EVMS Policies, it adheres to the intent of the ANSI/EIA 748-B Standard for Earned Value Management Systems. The ANSI/EIA 748-B Standard is the EVMS guidance document for recipients of either Major Research Equipment and Facility Construction (MREFC) funds or American Recovery & Reinvestment Act (ARRA) funds. The OOI is a recipient of both.

Recipients of MREFC funds are expected to implement Earned Value as outlined by the National Science Foundation document entitled Large Facilities Manual (May 2007 / NSF 07-38). The LFM points to the Office of Management and Budget (OMB) document entitled *Planning, Budgeting, Acquisition and Management of Capital Assets* for guidance on Earned Value. This document is Part 7 of the OMB Circular A-11.

Recipients of ARRA funds are also expected to implement Earned Value per Part 7 of the OMB Circular A-11. OMB Circular A-11 requires the use of earned value "or similar" performance-based management system and refers to ANSI-EIA 748 EVMS Standard for guidance and policies concerning Earned Value.

The document includes:

- Introduction to Earned Value Management
- Statement of the OOI EVM Policies
- Description of the OOI EVM Roles and Responsibilities
- Description of the OOI EVM Infrastructure
- Description of key OOI EVM Policies

This document does not include implementing organization (IO) specific business processes that each IO will need to follow in order to adopt the OOI Earned Value Management System. It is the responsibility of each IO to define these business processes.

1.2 Document Audience

The audience for this document is anyone involved in the planning, execution and monitoring of the OOI from the perspective of the OOI Earned Value Management System. The primary audience members are the National Science Foundation (NSF), the OOI Management team and the Implementing Organizations.

Implementing Organizations are best represented by the component of the OOI they represent:

- Program Management Office (PMO), Ocean Leadership
- Cyberinfrastructure (CI), University of California, San Diego
- Coastal and Global Scale Nodes (CGSN), Woods Hole Oceanographic Institution
- Regional Scale Nodes (RSN), University of Washington
- Education and Public Engagement (EPE), To be named

From the perspective of this document, the PMO is considered an implementing organization (IO) subject to the EVMS Guidelines. The OOI PMO is also considered the governing body of the OOI and the owner of the OOI Change Management process.

2 Earned Value Management

Earned Value Management (EVM) is a project management methodology for integration of cost, schedule and technical management. EVM provides enhanced visibility and analysis of program data using quantitative and objective methodologies for performance measurement.

The foundation of EVM is based upon the assignment of a "measurable value" of work that has been planned and budgeted. The value of work is earned as progress is made against the Tasks in the baseline Integrated Master Schedule (IMS). Progress, or Earned Value (EV), can be quantified and used to measure two items;

- The amount of actual work accomplished to-date versus the amount of work planned to be accomplished to-date. This yields an EVM schedule variance.
- The cost of the actual work accomplished to-date versus the budget associated with the amount of work accomplished to-date. This yields an EVM cost variance.

EVM provides "early warning" indicators of potential project issues, enabling implementation of corrective actions to ensure an on-time, on-budget delivery of the desired end products or services.

The OOI EVM system will use the principles and software toolsets described within this document to integrate the defined scope of work for the Ocean Observatories Initiative (OOI) program with its corresponding schedule and budget elements and to objectively measure progress.

Familiarity with general EVM concepts is useful for reading this document and supporting discussion of the OOI EVM Policy. The concepts described in this section are not to be interpreted as OOI EVM Policy.

2.1 ANSI 748-B EVMS Standard

The ANSI/EIA 748-B Standard incorporates best business practices for program management systems that have proven to provide strong benefits for program or enterprise planning and control. Though originally targeted for the Department of Defense, the Standard has been adopted by the Department of Energy and many other civilian government agencies.

The Office of Management and Budget (OMB) circular A-11, Part 7 requires the use of the ANSI 748-B EVMS standard on all *'major information technology (IT) investments and for major non IT capital assets'* as defined by each agency. This is usually based on the project size (in dollars) or risk, and has been applied on projects as little as $5M, making Earned Value Management one of fastest growing management disciplines in the industry."

2.2 Work Breakdown Structure (WBS)

The Work Breakdown Structure (WBS) is a product-oriented hierarchical structure that allows for decomposition and analysis of the effort or “work” required to produce an end product. The WBS identifies all of the products (i.e., hardware, software, system engineering, etc.) from the top-level contract down to the lower level of manageable work elements.

The WBS provides the framework within which management control points referred to as Control Accounts, Work Packages and Planning Packages are positioned relative to the overall program. It is also the framework in which work is organized, Tasks are scheduled, resources are budgeted, actual costs are tracked and performance is measured. Each item in the WBS has a unique identifier, usually referred to as a WBS number.

2.3 Work Breakdown Structure Dictionary (WBS Dictionary)

The Work Breakdown Structure Dictionary accompanies the WBS and includes narrative information for each WBS element that includes a brief description of the work scope, required deliverables, a list of associated activities and a list of key milestones. It may also include the responsible organization, start dates, end dates, required resources, and estimate of cost, charge number, quality requirements and technical references that facilitate the performance of the work.

It can also include the entrance and exit criteria used for understanding the appropriate prerequisite and post-requisite Tasks associated with the WBS element.

2.4 Integrated Master Schedule (IMS)

An Integrated Master Schedule (IMS) contains the logic network-based framework that provides the basis for time-phasing and coordinating all program efforts and resources. The IMS typically reflects both baseline and current schedule data. The time phasing of Tasks and assignment of necessary Task resources within the IMS is critical to development of a Performance Management Baseline (PMB) and successful implementation of EVM.

An IMS consists of as many fully resource loaded project schedules as necessary to fully represent the scope of an overall program. Cross project dependencies are defined to knit the multiple project schedules into a single cohesive IMS.

2.5 Control Account (CA)

A Control Account (CA) is a logical management control point to which program budgets (resource plans) and actual costs are summarized and compared to earned value for management control purposes and formal reporting to external entities such as the National Science Foundation.

Control Accounts are comprised of one or more Work Packages or Planning Packages.

2.6 Work Package (WP)

A Work Package (WP) is a further subdivision of work effort below the Control Account. A Work Package consists of one or more Tasks that represent the work associated with delivery of one or more products. A Work Package has the following characteristics:

- It represents units of work at levels where work is performed.
- It is clearly distinguished from all other Work Packages.
- It is assigned to a single organizational element (e.g., subcontractor).
- It has scheduled start and completion dates.
- It contains, as applicable, interim milestones representative of physical accomplishments.
- It has a budget expressed in terms of hours, direct dollars or other measurable unit (typically stemming from unit pricing of material).

2.6.1 Work Packages – Discrete

A discrete Work Package represents work culminating in the deliver of product. A Work Package representing discrete work is comprised of only Tasks that represent discrete work. As a general rule, discrete Work Packages should not exceed 1 to 3 calendar months in span.

A discrete Work Package represented by a single Task should be relatively short in duration to facilitate effective progress measurement. A discrete Work Package longer in duration should be represented by multiple Tasks, each of which is relatively short in duration (again) to facilitate effective progress measurement. The shorter duration encourages definition of discrete effort which can be measured more objectively hence minimizing subjectivity.

2.6.2 Work Packages – Level of Effort (LOE)

A level-of-effort Work Package represents work that does not culminate in the delivery of product. A Work Package representing level-of-effort work is comprised of only Tasks (often only one Task) that represent level-of-effort work. Value is earned exactly as it was budgeted since the work does not result in product and there is no tangible object against which progress can be reasonably measured.

A common example of level-of-effort work is project management. Project management is critical to the successful delivery of a product, but does not result in a product unto itself. Hence, the budget associated with Project Management is earned as it is budgeted.

2.7 Task

A Task describes the work below the Work Package level and is characterized by a descriptive name, duration and resource estimates. Tasks are the most detailed level representation of work, the entities to which schedule constraints are assigned and the entities between which schedule logic / relationships are defined.

Tasks, for the sake of earning value, can be treated as weighted milestones. With this approach, each Task within a Work Package is assigned a weight relative to the other Work Package Tasks. The weight of the Task divided by the composite weight of all Tasks that comprise the Work Package defines the ratio by which the Work Package budget is multiplied to calculate earned value, once the Task is marked as complete. Zero effort milestones can be included in this approach.

2.8 Performance Measurement Baseline (PMB)

The Performance Measurement Baseline (PMB) is the time-phased budget plan against which contract performance is measured. It consists of the budgets assigned to scheduled Tasks and the applicable indirect budgets.

2.9 Budgeted Cost for Work Scheduled (BCWS)

The Budgeted Cost for Work Scheduled (BCWS) is the sum of the budgets of all Work Packages scheduled to have been completed, or partially completed, by a given point in time. BCWS is also commonly referred to as Planned Value (PV).

2.10 Budgeted Cost for Work Performed (BCWP)

The Budgeted Cost for Work Performed (BCWP) is the sum of the budgets for completed Work Packages and completed portions of open Work Packages. BCWP is also commonly referred to as Earned Value (EV).

2.11 Actual Cost of Work Performed (ACWP)

The Actual Cost of Work Performed (ACWP) is the sum of the costs actually incurred to complete closed Work Packages or to partially complete open Work Packages. ACWP is also commonly referred to as Actual Costs (AC). It consists of both posted costs and estimated costs. Estimated

costs are necessary when latency issues with posted costs preclude an accurate representation of ACWP.

2.12 Estimate to Complete (ETC)

The Estimate to Complete (ETC) is the sum of the estimates for unopened Work Packages and remaining portions of open Work Packages. It is the portion of the Estimate-at-Complete that addresses total expected costs for all work remaining on the contract.

2.13 Budget at Complete (BAC)

The Budget at Complete (BAC) is the sum of the budgets of all Work Packages at the completion of the project.

2.14 Estimate at Complete (EAC)

The Estimate at Complete (EAC) is the sum of the actual costs (posted and estimated) incurred to date, plus the estimate of costs for all remaining work.

2.15 Earned Value Methodology Metrics

BCWS, BCWP and ACWP are the three Earned Value components required to calculate Cumulative-to-Date and Current Period Earned Value metrics. ETC or EAC (one results in the other) is the additional component necessary to calculate At-Complete Earned Value metrics. Fundamental Earned Value metrics are listed in the following table.

Earned Value Metric	Earned Value Metric Calculation
Budget At Complete (BAC):	BCWS at Completion
Estimate At Complete (EAC):	ACWP + ETC
Variance At Complete (VAC):	BAC - EAC
Cost Variance (CV):	BCWP - ACWP
Schedule Variance (SV):	BCWP - BCWS
Cost Variance (%):	(CV / BCWP) *100
Schedule Variance (%):	(SV / BCWP) *100
Cost Performance Index (CPI):	BCWP / ACWP
Schedule Performance Index (SPI):	BCWP / BCWS
% Schedule:	(BCWScum / BAC) * 100
% Complete:	(BCWPcum / BAC) * 100
% Spent	(ACWPcum / BAC) * 100

Table 1: Earned Value Methodology Metrics

2.16 Format 1 Cost Performance Report (CPR Format 1)

A Format 1 Cost Performance Report is organized by WBS element and includes current period and cumulative-to-date values for budgeted cost (BCWS), performance (BCWP), actual cost (ACWP), schedule variance (SV) and cost variance (CV). It also includes at completion values for budgeted cost (BAC), estimated cost (EAC) and the projected variance (VAC).

2.17 Format 5 Cost Performance Report (CPR Format 5)

A Format 5 Cost Performance Report contains the narrative explanations and problem analyses for cases when variances identified in the CPR Format 1 report exceed pre-defined thresholds. The source of the variance should be well documented. The corrective action for the source of the variance should be well documented.

2.18 Over Target Baseline (OTB)

An Over Target baseline (OTB) is a condition in which the project budget and schedule in the existing PMB exceeds the target cost. Increasing budgets for remaining work without a related increase in the contract value results in the total allocated budget to exceed the target cost. Formal Re-planning is required to address an Over Target Baseline.

2.19 Re-Planning Techniques

The following table describes common re-planning scenarios and their respective impact on an EVM system. All scenarios assume proper Change Management is conducted prior to taking the re-planning action.

Scenario	Re-Planning Action	EVMS Impact
Re-plan a project that does not require Earned Value	Set Planned Value equal to Actual Cost as of the re-planning period	BCWScum = ACWPcum
Eliminate a cost variance	Set Earned Value equal to Actual Cost as of the re-planning period	BCWPcum = ACWPcum
Eliminate a schedule variance	Set Planned Value equal to Earned Value as of the re-planning period.	BCWScum = BCWPcum
Partial re-plan of an in-flight project that requires Earned Value. (Partial Re-baseline)	Set Earned Value and Planned Value equal to Actual Costs as of the re-planning period for the affected Work Packages	BCWScum = ACWPcum BCWPcum = ACWPcum
Total re-plan of an in-flight project that requires Earned Value (Total Re-Baseline)	Set Earned Value and Planned Value equal to Actual Costs as of the re-planning period for all Work Packages	BCWPcum = ACWPcum BCWScum = ACWPcum

Table 2: Re-Planning Techniques

2.20 Bill of Materials (BoM)

The Bill of Materials (BoM) is a listing of the raw materials, sub-assemblies, intermediate assemblies, sub-components, components, parts and the quantities of each needed to manufacture an end item (final product).

3 OOI EVM Policies

The OOI EVM Policies describe how the OOI EVMS adheres to the intent of the ANSI/EIA 748-B Standard for Earned Value Management Systems. The OOI EVM policies ensure an effective and uniform implementation of EVM. Supplemental policies that support the effective and efficient management of the OOI program may be applied by individual IOs at their discretion.

The authority to waive or change an OOI EVM Policy rests with the OOI PMO and is subject to the Change Management policies and procedures defined in the Configuration Management Plan (CMP), document control number 1000-00000.

Implementing Organizations may request exceptions to the guidelines by submitting a written request for waiver to their respective COTR, with the specific details of the request. Exceptions to the guidelines contained in the Annual Work Plan information are to be specifically identified / called out in the work plan.

At its highest level, the ANSI/EIA-748-B Standard for Earned Value Management Systems consists of 5 EVMS Process Areas that serve as a framework for organizing the OOI EVMS Guidelines: The five EVM process areas are:

- Organization
- Planning and Budgeting
- Accounting
- Analysis
- Revisions & Data Maintenance

3.1 EVM Process Area: Organization

3.1.1 OOI EVM Policies – WBS

a. The OOI WBS shall reflect the entire scope of work described by the Final Network Design and Annual Work Plan documents.

b. The OOI WBS Dictionary shall contain a narrative description of the scope of work for each OOI WBS element down to the Work Package level.

c. IO schedules shall adhere to the OOI WBS.

3.1.2 OOI EVM Policies – Process

a. IO specific EVM business processes shall be owned by the IO and shall support the OOI EVM policies. Such processes are subject to audit by an external agency.

b. OOI PMO shall, at their discretion, audit IO specific EVM business processes for compliance to OOI EVM policies.

c. Schedule and cost data shall be input into the OOI EVMS at the Work Package level or lower.

d. Schedule and cost data shall be reported out of the OOI EVMS at the Control Account level or higher.

3.1.3 OOI EVM Policies - Integration

a. IO project schedules shall be prepared and maintained using Microsoft Project Professional.

b. IO project schedules shall be published to Microsoft Project Server in support of the Integrated Master Schedule (IMS).

c. IO cost & schedule data (i.e., BCWS, ACWP & BCWP) shall be integrated in Deltek Cobra, the EV engine of the OOI EVMS.

d. The fields that must be maintained in Microsoft Project Server for the sake of cost / schedule integration shall be captured in the Common Fields (CF) document, entitled *1020-0001_Scheduling_Common_Fields_Reference_OOI*.

3.2 EVM Process Area: Planning, Scheduling & Budgeting

3.2.1 OOI EVM Policies – Planning

a. Work effort shall be organized into Control Accounts and each Control Account shall be placed within the OOI WBS. Control Account definition is subject to OOI PMO review.

b. Control Accounts shall generally span up to one year, however, can span a longer period of time with prior approval from the OOI PMO.

c. Control Accounts shall be comprised of one or more Work Packages.

d. Discrete Work Packages shall represent a deliverable or project work component against which objective progress can be measured.

e. Discrete Work Packages shall not span more than 3 calendar months. A greater span is often times an indicator that the Work Package represents more than a deliverable or project work component against which objective progress can be measured. Exceptions can be made with approval of the OOI PMO.

f. A Work Package shall be comprised of one or more Tasks. Work Packages that represent discrete work shall be comprised of only Tasks that represent discrete work. Work Packages that represent Level-of-Effort (LOE) work shall be comprised of only LOE Tasks.

g. Tasks may be added to better define the existing scope of a Work Package, but additional scope may not be added to an open or future Work Package without proper OOI Change Management.

h. Planning Packages shall be used to represent far-term effort that can be identified and budgeted but cannot yet be defined into Work Packages. Beyond the project year for which planning and budgeting is complete or underway is considered “far-term”.

i. Planning Packages shall be converted into Work Packages and decomposed into Tasks first in the Annual Work Plan, then, once approved, in the OOI EVM system.

j. Planning Packages for an upcoming project year shall be planned and budgeted in the same manner as Work Packages no less than 90 days prior to the start of the upcoming project year.

3.2.2 OOI EVM Policies – Scheduling

a. Project schedules shall consist of Tasks that represent definitive product and/or scope against which objective status can be measured.

b. Tasks, at a minimum, shall consist of a name, start date, finish date and duration.

c. Tasks shall be placed into their proper place in the OOI WBS, below the Work Package to which they belong.

d. Project schedules shall have sufficient predecessor/successor relationships to

perform meaningful and accurate critical path analysis and “what if” predictive modeling.

e. Predecessor / Successor relationships shall be modeled as type Finish-to-Start (FS). Presence of other relationship types is often times an indicator that the Tasks are not sufficiently defined to represent a logical sequencing of work. Exceptions can be made with approval of the OOI PMO.

f. Predecessor / successor relationships for the current planning year shall exist only between WBS level elements designated as Tasks and/or Milestones and never between WBS level elements designated as Work Packages or above.

g. Predecessor / successor relationships for future planning years shall exist only between the lowest level WBS elements.

3.2.3 OOI EVM Policies – Budgeting

a. Project schedules shall be resource loaded at the Task level for the current project year plan.

b. Project schedules shall be resource loaded at the Planning Package level or below for effort beyond the current project year plan.

c. Effort shall be budgeted in terms of the Resource Types defined in the OOI Resource Table for which Microsoft Project Server is the system of record.

d. Tasks shall be mapped to their corresponding Work Package and Control Account to facilitate cost-schedule integration.

e. IOs shall document and submit their respective indirect and fringe budgeting rates each year to support development of the Annual Work plan (AWP).

f. Cost Book shall be the integration point for direct and indirect budgeting rates (e.g. indirect, fringe & inflation) and the source system of these rates from the perspective of Cobra.

g. Cost Book shall be the system of record for the initial PMB.

h. Retroactive changes to budgets require OOI Change Management.

i. Material costs, at a minimum, shall be budgeted at the Work Package level by Resource Category. Material costs, at IO discretion can be budgeted at the Work Package by Resource Type.

j. Subcontractor costs, when the contractor is a named partner or recipient of a contract in excess of $250,000, shall be represented by contractor specific Resource Types on a single Work Package when the contract represents a definitive work product to be delivered to the IO. These contracts must be individually track-able.

k. Subcontractor costs, when the contractor is a named partner or recipient of a contract in excess of $250,000 shall be represented by contractor specific Resource Types when the contract represents staff augmentation.

3.3 EVM Process Area: Accounting

3.3.1 OOI EVM Policies – Actual Costs

a. Actual Costs (ACWP) shall be supplied to the OOI EVMS at the Work Package level by Resource Category on a monthly basis.

b. Actual Costs (ACWP) supplied to the OOI EVMS shall represent cumulative-to-date costs as of the current reporting period.

c. Actual Costs (ACWP) shall appear in the Earned Value Management System

(EVMS) in the reporting period in which they occur and associated to the budget assigned for the work scope with which the Actual Costs are associated.

d. IOs shall conduct formal reconciliation of ACWP data to their respective accounting ledgers bi-annually in association with the close and mid-point of their respective fiscal years. The reconciliation process shall be complete within 6 months or prior to the beginning of the subsequent reconciliation exercise.

e. Retroactive changes to actual costs for completed work are permitted only for normal accounting adjustments or correction of errors.

f. Vacation shall be charged against a central vacation pool / budget whenever one exists. Otherwise, vacation will be charged to the charge number(s) open at the time vacation is taken.

g. Actual Costs (ACWP) shall be provided to two significant digits.

3.3.2 OOI EVM Policies – Estimated Costs

a. Actual Costs (ACWP) supplied to the OOI EVMS shall include estimated costs in order to compensate for latency issues with posted costs. Posted and estimated costs shall combine to provide a reasonable cumulative-to-date ACWP as of the current reporting period.

b. Actual hours and labor rates shall be used to give a reasonable estimate of costs. Exceptions can be made with prior approval of the OOI PMO.

c. IOs shall maintain open purchase orders and outstanding invoices to aid in the identification of estimated costs.

3.3.3 OOI EVM Policies – Material Actual Costs

a. Material costs shall be recorded in the same accounting period that value is earned. Estimated costs shall be used to meet this policy should posted costs be unavailable due to accounting latency issues.

b. Actual material pricing shall be used when at all possible to give a reasonable estimate of costs.

c. Each IO shall be able to trace Material or Equipment Actual Costs (ACWP) in excess of $5,000 to a Bill of Materials maintained by the IO.

3.4 EVM Process Area: Analysis

3.4.1 OOI EVM Policy – Analysis

a. The OOI shall conduct monthly project status meetings with IO Project Managers to review schedule, budget and the status of major OOI Program milestones.

b. IO schedule status shall be provided to the OOI Master Scheduler on a monthly basis for incorporation into the integrated Master Schedule.

c. The IOs shall manage and analyze data at the Work Package level (or below) of the OOI WBS.

d. The OOI PMO shall manage and analyze data at the Control Account level (or above) of the OOI WBS unless a Control Account variance exceeds a predefined threshold and further investigation is required. The OOI Programmatic thresholds are documented in Appendix A-7.

e. The IOs shall enter into the OOI EVMS Variance Analysis Reports on a monthly basis for each Control Account with a variance in excess of a predefined threshold. The OOI Programmatic thresholds are documented in Appendix A-7.

3.4.2 OOI EVM Policy – Earning Value

a. BCWP (Earned Value) shall be earned and tracked at the Work Package level.

b. A Performance Measurement Technique (PMT) shall be assigned to each Work Package. The methods for earning value shall ensure measured progress is objective.

c. The Performance Measurement Technique (PMT) of a Work Package shall not be changed once the Work Package is underway. The PMT of a future Work Package can be changed provided proper Change Management is followed.

d. Discrete Work Packages shall use the "Weighted Milestones" Performance Measurement Technique. Tasks and Milestones that contribute to the calculation of the Work Package Earned Value shall be assigned a weight.

e. Discrete Work Packages can also use "Percent Complete" Performance Measurement Technique, but only on an exception basis and with OOI PMO approval. Use of this PMT can indicate Tasks are not sufficiently defined to objectively measure progress.

f. Work Packages that do not represent discrete work against which status can objectively measured shall utilize the "Level-of-Effort" Performance Measurement Technique. This method earns value per the original budget thus precluding any schedule variance.

g. Use of the Level-of-Effort Performance Measurement Technique shall be minimized since it earns value per the original budget thus precluding any schedule variance and diluting summary level EV metrics.

h. Retroactive changes to BCWP require OOI Change Management.

i. Material associated with discrete work shall be earned at the time purchased materials are received or when issued for assembly from inventory or vendors.

3.4.3 OOI EVM Policy – Estimates-to-Complete

a. Estimates to Complete shall be generated taking into account cumulative-to-date Actual Costs (AC), cumulative-to-date earned value performance metrics and mitigation actions implemented by either the IO Project Manager or the OOI Program Manager.

3.4.4 OOI EVM Policy – Reporting

a. Each month, the OL shall submit a Format 1 Cost Performance Report to the National Science Foundation (NSF) at the Control Account level of the OOI WBS.

b. Each month, the OL shall submit a Format 5 Cost Performance Report to the National Science Foundation (NSF) for Control Accounts that have exceeded a predefined threshold. The OOI Programmatic thresholds are documented in Appendix A-7.

3.5 EVM Process Area: Revisions & Data Maintenance

- From the perspective of an EVM System, changes that impact the program baseline must be planned, authorized, documented and incorporated into the baseline.
- The OOI Change Management process shall be followed whenever a change impacts the OOI program baseline. In this context the baseline refers to the schedule of major OOI milestones / deliverables and the Performance Measurement Baseline (budgets).
- The OOI Change Management process shall be followed whenever a release of Contingency Funds is requested.
- OOI EVM documentation shall be placed under OOI Change Management. Those documents include, but are not limited to:
  - ✓ Earned Value Management Plan (EVM Plan)
  - ✓ Integrated Master Schedule (IMS)
  - ✓ Common Fields Reference (CFR)
  - ✓ Performance Measurement Baseline (PMB)
  - ✓ Schedule Management Plan (SMP)
  - ✓ Cost Estimating Plan (CEP)
  - ✓ Project Execution Plan (PEP)
  - ✓ Annual Work Plan (AWP)
- The OOI Change Management process is described in the Configuration Management Plan document entitled *1000-00000_CMP_OOI.*

4 OOI EVMS Roles & Responsibilities

The roles and responsibilities described herein are strictly from the perspective of the OOI EVMS. The PMO must report as an implementing organization and manage the program as the OOI Program Management Office.

4.1 OOI Project Manager

The OOI Project Manager role is responsible for planning and management of all work effort associated with the OOI initiative. In addition, the OOI Project Manager:

- Integrates management and engineering activities of the PMO, the COTRs and the IOs.
- Proactively monitors IO performance to planned budget and deliverables.
- Introduces corrective strategies and actions as appropriate to maintain project performance.

4.2 IO Project Manager

The IO Project Manager role is responsible for planning and management of all work effort belonging to an IO. This role is the point-of-contact for all questions pertaining to the execution of IO work and is ultimately responsible for the integrity of the IO schedule, budgets and status updates. The IO Project Manager works with the OOI Program Manager to facilitate corrective action. All IO roles are accountable to the IO Project Manager.

4.3 OOI Master Scheduler

The OOI Master Scheduler role is responsible for the OOI Integrated Master Schedule (IMS). As such, this role:

- Coordinates the creation and maintenance of the OOI WBS and OOI WBS dictionary
- Integrates IO schedules into the OOI IMS
- Facilitates discussions with IO Project Managers to identify cross project dependencies
- Creates and manages cross project dependencies in the IMS
- Incorporates monthly status updates provided by the IO Schedulers
- Facilitates analysis of the OOI Program critical path and key OOI milestone schedules
- Creates and maintains the IMS Schedule Management Plan and Common Fields Reference documents
- Creates and submits the monthly IMS Analysis Report to the OOI PMO
- Acts with the IT Administrator to maintain MSP Server operation and data files

4.4 IO Financial Analyst

The IO Financial Analyst role is responsible for the collection, review, validation and submission of actual and estimated costs on a monthly basis to the EV Manager for input into the OOI EVMS. This role is also responsible for supplying IO specific labor and burdening rates to the OL.

4.5 IO Scheduler

The IO Scheduler role is responsible for creation, maintenance and integrity of component IO schedules that comprise the OOI Integrated Master Schedule. Each IO schedule is owned by a single IO Scheduler. The IO Scheduler role:

- Facilitates analysis of the IO Schedule critical path and key IO milestone schedules
- Works with the OOI Master Schedule to identify cross-project dependencies
- Estimates effort in terms of Resource Types assigned to Tasks
- Reviews schedule updates provided by the Control Account Managers
- Selectively accepts/rejects updates provided by Control Account Managers
- Provides the OOI Master Scheduler monthly status updates
- Performs IO “what-if” and re-planning scheduling scenarios
- Implements changes to the IO schedule
- Manages schedule components critical to cost/schedule integration

4.6 IO EV Manager

The IO EV Manager role is responsible for:

- Validating the annual budget in Cobra
- Loading actual costs provided by the Financial Analyst into the OOI EVMS
- Loading schedule status provided by the Scheduler into the OOI EVMS
- Processing EVM data
- Validating processed EVMS data

The IO EV Manager role can be fulfilled locally by the IO or centrally by the PMO.

4.7 IO Control Account Manager

The Control Account Manager (CAM) role is responsible for management of the Control Accounts assigned by the IO Scheduler. For those Control Accounts, this role provides monthly schedule status at a Task level to the IO Scheduler and assists in the development of future Annual Work Plans. This role is accountable to the IO Project Manager role.

5 OOI Earned Value Management Infrastructure

The OOI Earned Value Management Infrastructure includes several key data components, including:

- Work Breakdown Structure
- Resource Types classified by Resource Category
- Integrated Master Schedule
- Direct & Indirect Rates
- Performance Measurement Baseline (PMB)
- Labor, Material & ODC Actual Costs

The OOI Earned Value Management Infrastructure consists of the following tools to facilitate the creation and management of the above key data components:

- Microsoft Project Server
- Microsoft Project Professional
- OOI Cost Book
- Update forProject
- IO Accounting Systems
- Deltek Cobra
- Deltek wInsight

Figure 1, *OOI Earned Value Management Infrastructure*, describes the interaction of these tools and key data components.

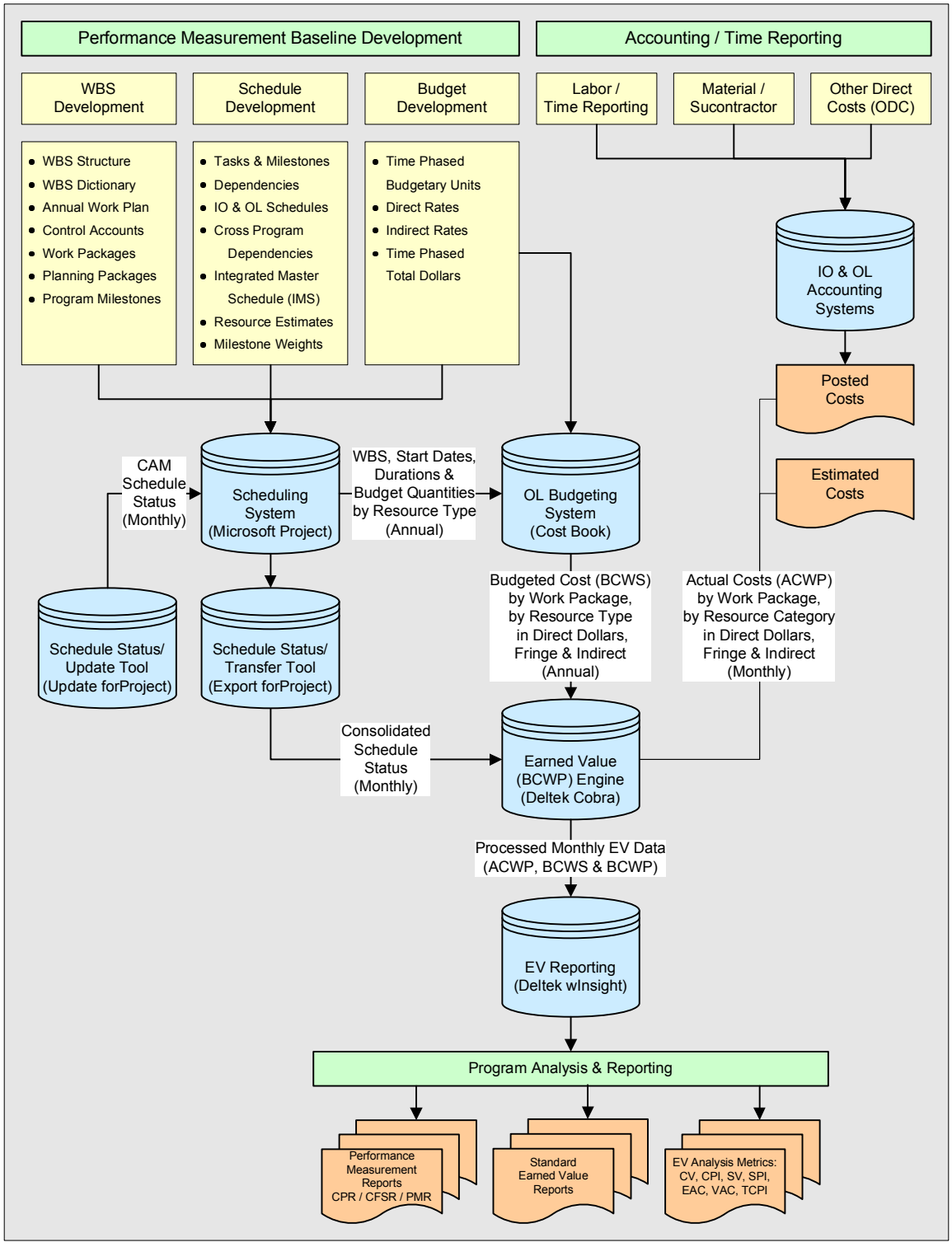


Figure 1: OOI Earned Value Management System Infrastructure

5.1 Microsoft Project Server

Microsoft Project Server is the source system for the Integrated Master Schedule (IMS). It is configured to support the necessary data fields to integrate the component schedules and pass data to Cobra, the EVM engine.

5.2 Microsoft Project Professional

Microsoft Project Professional is the source system for the detailed IO schedules and the detailed OL schedules, all of which are fully resource loaded. The schedules, in conjunction with a monthly status and update cycle are published to Microsoft Project Server.

5.3 OOI Cost Book

Ocean Leadership has developed an in-house budgeting tool called Cost Book that is integral to the OOI Earned Value Management Infrastructure. It is the OOI integration point for all IO and OL direct and indirect budgeting rates, the source system of these rates from the perspective of Cobra and the system of record for the initial PMB.

Cost Book is integrated with Microsoft Project Server. It takes receipt of start date, calendar duration and resource quantities by resource type for all WBS Elements with which effort is associated as well as all levels of summary WBS elements. Once in Cost Book the budget rates can be applied to generate a fully burdened / total cost budgetary plan, summarized by WBS.

5.4 Deltek Cobra

Deltek Cobra is the Earned Value software component of the OOI Earned Value Management Infrastructure. The Cobra Integration Wizard is used to pull enterprise data components from Microsoft Project Server such as the WBS, Control Accounts, Work Packages and the Resource Breakdown Structure (RBS) which consists of the OOI Resource Types by Resource Categories.

The fully burdened Performance Management Baseline (BCWS) is loaded into Cobra via transaction files generated by Cost Book. The Cobra Integration Wizard is also used to pull schedule status from Microsoft Project Server on a monthly basis which drives the Earned Value (BCWP) calculations at the Work Package level.

Cobra also takes receipt of actual cost data (ACWP) via transaction files. Actual costs consist of both posted and estimated costs. Each IO and the OL must identify the appropriate source systems for estimated cost data.

Finally, the Cobra wInsight Wizard is used to generate an xml data file for Deltek wInsight, the OOI Earned Value analysis and reporting tool.

5.5 forProject

The forProject software products include add-in utilities that work inside Microsoft Project as well as other web-based products that compliment Microsoft Project in an EVMS environment. The OOI initiative will utilize two of the forProject utilities.

5.5.1 Update forProject

Update forProject is a web-based application that distributes schedule updates to the people responsible for the work, typically the Control Account Manager (CAM). This gives the CAM

control over their assigned portions of the project schedule without having to grant access to the schedule. The schedule owner can review the updates and selectively apply and/or reject them.

5.5.2 Export forProject

Export forProject allows data from Microsoft project to be selectively mapped and exported to external data sources in multiple file formats. This utility will be used to transfer accepted updates from the Microsoft Project schedule to Cobra to support monthly calculation of earned value.

5.6 IO Accounting Systems

The respective IO accounting systems are the collection points and systems of record for IO posted costs. The posted cost component of the ACWP data in Cobra (at the Work Package level by Resource Category) must reconcile to the IO systems of record (IO accounting systems).

5.7 Deltek wInsight

Deltek wInsight is the OOI Earned Value analysis and reporting tool. This tool takes receipt of fully processed Earned Value data from Cobra via an xml data file that is created using the Cobra wInsight Wizard.

5.8 Software Components by Role

The following diagram represents the anticipated software requirements by role for the initial deployment of the OOI EVM system. Referenced systems are provided and supported by Ocean Leadership with the exception of MS Project Professional which resides on respective IO desktops / laptops.

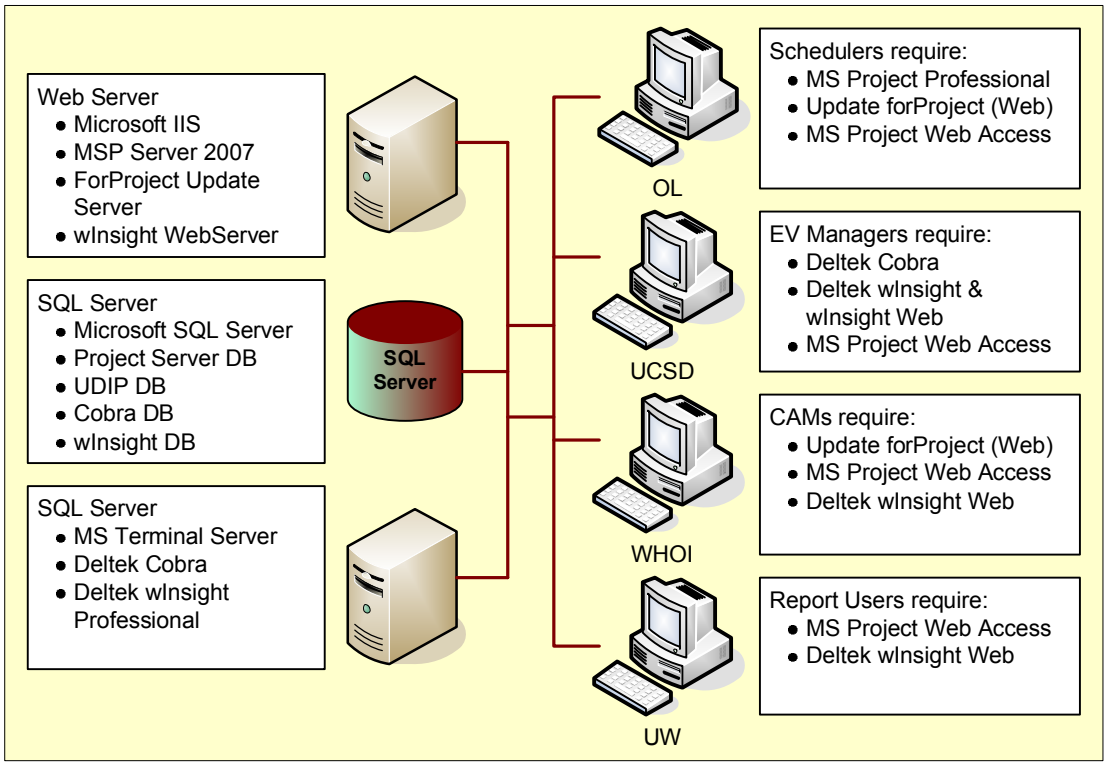


Figure 2: OOI EVM Software Components by Role

5.9 Future State Consideration

5.9.1 Cost Book

The timeframe for entry of the initial Performance Measurement Baseline mandates the source of that information be Cost Book. However, the PMO has the option to perform future re-planning and annual budget development directly in Cobra rather than Cost Book. Cobra has a built-in Integration Wizard that takes schedule and resource information directly from Microsoft Project Server.

Adoption of Cobra for this purpose is dependent on Cobra's ability to accurately portray the unique indirect cost structure of the OOI that includes a material burden based on periodic labor and a threshold above which indirect costs are not associated with material and subcontractor costs. Implementation of this rate structure is an effort that begins post implementation. Then the Cost Book and Cobra budgetary plans can coexist in parallel until the rate structure is accurately portrayed and the OL is comfortable with the representation of the budgetary plan in COBRA.

5.9.2 Cobra v5.0

Deltek Cobra is the Earned Value software component of the OOI Earned Value Management Infrastructure. The OOI will adopt Cobra v4.7 initially and migrate to Cobra v5.0+ post implementation. Cobra 4.7 is the most prevalent version among the Cobra installation base and reasons for adopting it include:

- Cobra v5.0 represents a dot-zero release with a re-designed user interface and new underlying technology. It is recommended that OOI await, at a minimum, the first update to v5.0 which will represent an issue resolution release.
- The initial release of Cobra v5.0 includes less functionality than v4.7. Future releases will build back up to the full functionality of v4.7.
- Vendor and third party training & presentation materials are still concentric to v4.7. The Cobra redesigned user interface invalidates all graphic representations of the tool.

However, adoption of v5.0 is necessary. Its new technology base better aligns with OOI technology and has improved integration with Microsoft Project Server 2007. Migration considerations include the availability of updated training materials and user guides as well as the validation of the integration.

6 OOI EVM Processes

6.1 OOI Baseline Development Process

Core to Earned Value Management are the Integrated Master Schedule (IMS) and Performance Measurement Baseline (PMB). The PMB is the time-phased budget plan against which contract performance is measured. It is derived from the baseline of the IMS by taking the resource estimates assigned to scheduled Tasks and adding the applicable indirect budgets.

6.1.1 OOI Baseline Development Process

The following table represents the steps followed by the OOI in developing the initial baseline of the Integrated Master Schedule and its resulting Performance Measurement Baseline.

Step	Task	Tool	Process Steps	Output
1	OOI WBS Development	Microsoft Project 2003 (Desktop)	• Develop WBS hierarchy • Identify & Decompose Products • Identify WBS Element Type • Prepare WBS Descriptive Export	• WBS Structure • WBS Dictionary • WBS Export File Format
2	IO Schedule Development	Microsoft Project 2003 (Desktop)	• Define Tasks and Milestones • Estimate Starts, Finishes & Durations • Sequence Tasks	Un-resourced Schedule
3	OI Resource Allocation / Loading	Microsoft Project 2003 (Desktop)	• Identify Resource Types • Assign Resource Types to Tasks • Estimate Effort of Resource Types	Resource loaded Schedule
4	Integrate IO Schedules into IMS	Microsoft Project 2003 (Desktop)	• Obtain Current Copies of IO Schedules • Copy IO Schedules into separate file • Incorporate / Maintain Cross-Project Dependencies	**Integrated Master Schedule (IMS)**
5	Time Phased Budgeting	OOI Cost Book	• Import WBS & Resource Table • Import Start Dates, Finish Dates and Resource Estimates	BOE WBS
6	Annual Work Plan Development	OOI Cost Book	• Rate & burden BCWS • Validate Total Project Cost Estimates • Review Integrated IMS & PMB	**Performance Measurement Baseline**
7	Cost / Schedule Integration	Deltek Cobra	• Import WBS & Resource Table • Import fully burdened Budgetary Plan from Cost Book • Validate dollars against Cost Book • Review Integrated IMS & PMB	**Performance Measurement Baseline**

Table 4: OOI IMS & PMB Baseline Development Process

6.1.2 OOI Baseline Development Process (Planned Evolution)

The OOI process for establishing the baseline IMS and a PMB will evolve as the program ramps-up. Updates to the OOI EVM System Architecture provide the opportunity to improve upon this process. The following table represents the anticipated steps to developing subsequent baselines.

Step	Task	Tool	Process Steps	Output
1	OOI WBS Development	Microsoft Project 2007 (Desktop)	• Develop WBS hierarchy • Identify & Decompose Products • Identify WBS Element Type • Prepare WBS Descriptive Export	• WBS Structure • WBS Dictionary • WBS Export File Format
2	IO Schedule Development	Microsoft Project 2007 (Desktop)	• Define Tasks and Milestones • Estimate Starts, Finishes & Durations • Sequence Tasks	Un-resourced Schedule
3	IO Resource Allocation / Loading	Microsoft Project 2007 (Desktop)	• Identify Resource Types • Assign Resource Types to Tasks • Estimate Effort of Resource Types	Resource loaded Schedule
4	Integrate IO Schedules into IMS	Microsoft Project 2007 (Server)	• Refresh IMS with Current IO Schedules • Incorporate / Maintain Cross-Project Dependencies	Integrated Master Schedule (IMS)
5	Time Phased Budgeting	Deltek Cobra	• Import WBS & Resource Table • Import Start Dates, Finish Dates and Resource Estimates	BOE WBS
6	Annual Work Plan Development	Deltek Cobra	• Rate & burden BCWS • Validate Total Project Cost Estimates • Review Integrated IMS & PMB	Performance Measurement Baseline
7	Cost / Schedule Integration	Deltek Cobra	• No Additional Steps Required	Performance Measurement Baseline

Table 5: OOI IMS & PMB Baseline Development Process (Planned Evolution)

6.2 OOI EVM Schedule Status Update Process

Schedule status updates are performed monthly and evaluated against the baseline schedule and planned budgets. The IO Scheduler reviews updates from IO CAMs, approves final input and submits the updates to the OOI Master Scheduler. Status updates are entered against detailed Tasks in the schedule and used to calculate earned value at the Work Package level.

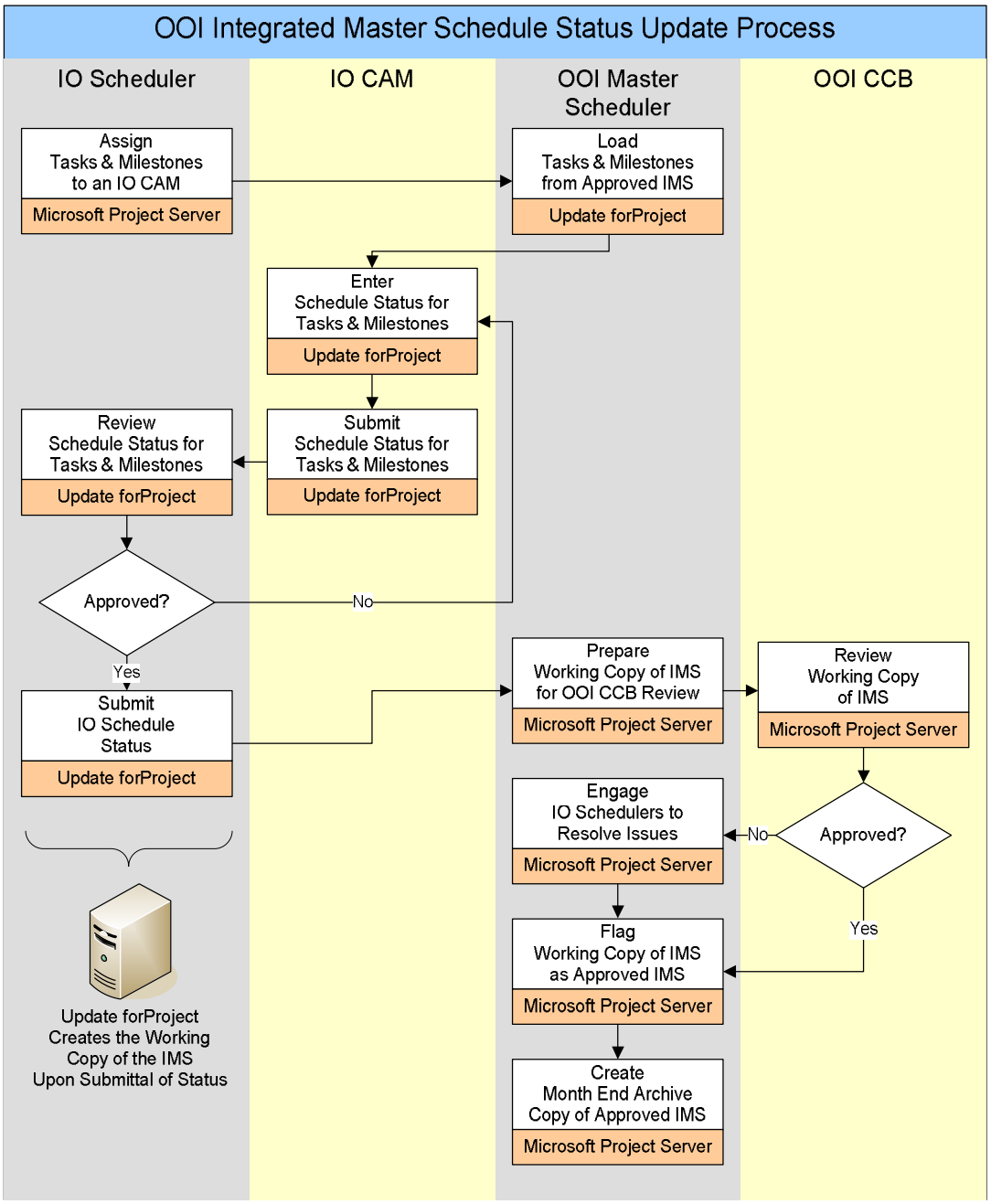


Figure 3: OOI EVM Schedule Status Process

Please refer to the document entitled *1020-00000_Schedule_Management_Plan_OOI* for details concerning the Schedule Status Update Process.

6.3 OOI EVM Cost Update Process

On a monthly basis, and in conjunction with the schedule update cycle, each IO submits updated cumulative-to-date actual costs at the Work Package level by Resource Category. The Cost Update process is represented in the following diagram.

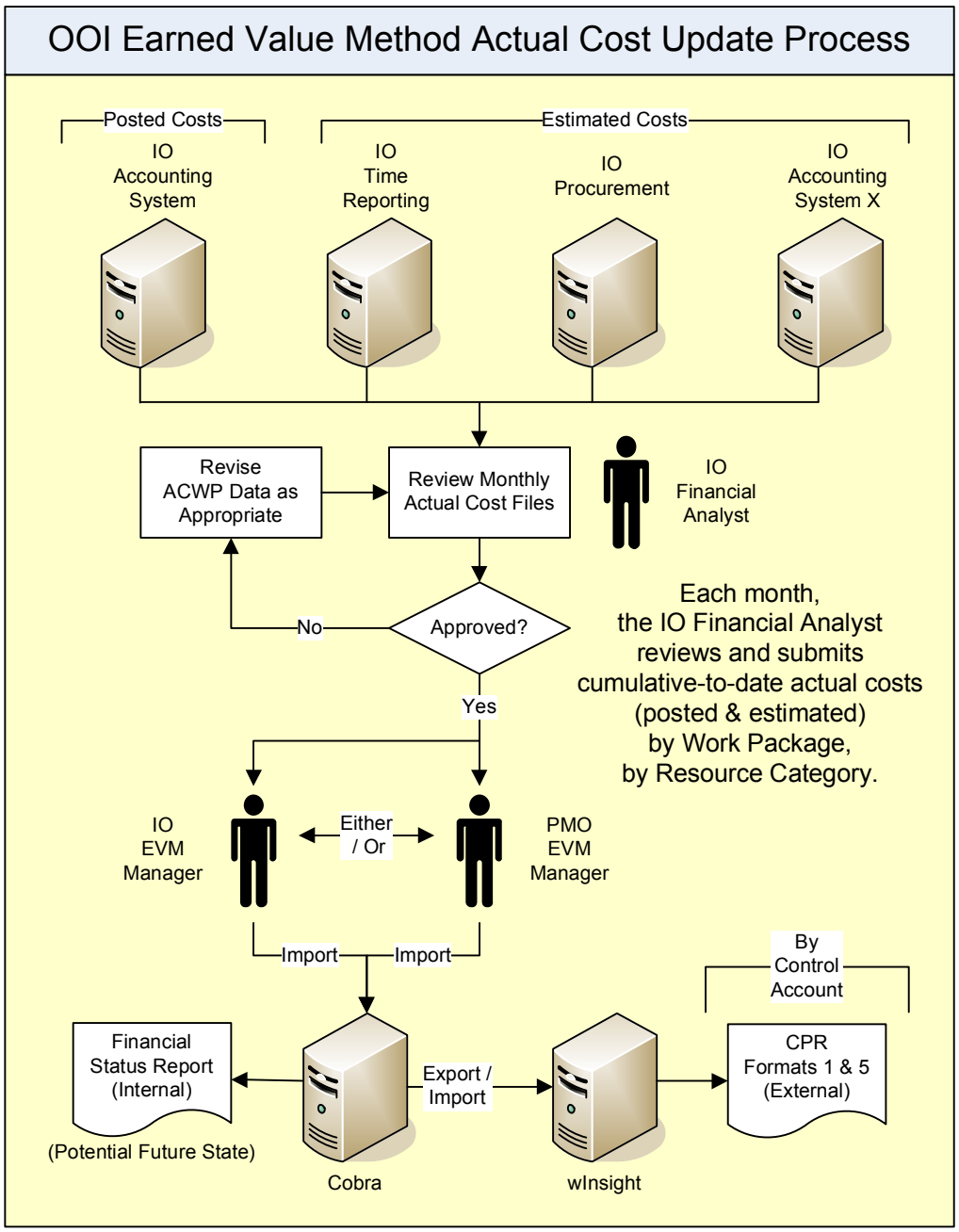


Figure 4: OOI EVM Cost Update Process

OOI EVM Plan Appendices

Appendix A-1: OOI Resource Categories

The standard OOI Resource Categories adopted for the OOI EVMS system from the OOI Financial Status Report (FSR) are:

- Labor
- Fringe
- Indirect
- Subcontracts
- Consulting
- Equipment
- Material
- ODC
- Travel

Implementing Organizations should use their respective accounting definitions for these categories. Some variation between the IOs usage of these Resource Categories is expected and acceptable. However, consistent use of these categories within each IO across BCWS and ACWP is required.

The following considerations are rules of thumb concerning several of the Resource Categories should an organization lack its own definition.

- Consulting is intended to capture purchased services (e.g., short term consulting, legal fees, accounting fees, etc.) not associated with a subcontract and not subject to the 100k G&A cap.
- Equipment is intended to capture large equipment costs (over $5K) associated with items such as software licenses and hardware purchases.
- Materials is intended to capture small to modest material costs (under $5K) associated with day-to-day execution of work such as a laptop, office supplies, copying / printing, publications and subscriptions.
- ODC is intended to capture other direct costs such as training, moving expenses, advertising, software maintenance, equipment rental and direct insurance.

Appendix A-2: Actual Cost (ACWP) Transaction File

Actual Cost (ACWP) Transaction File Definition

- From the perspective of Cobra, a transaction file is simply a file that contains data from an external system that must be loaded into Cobra.
- Transaction files must represent data in either a DBF format or a CSV format. The CSV format is recommended since a DBF file must contain the exact structure as your Cobra database tables which is difficult to model. DBF files are best suited for import when generated by Cobra.
- CSV stands for comma-separated values. Other terms for this type of file are comma delimited, ASCII, or simply a text file. CSV files can be opened in Microsoft Excel. Any Microsoft Excel spreadsheet can be saved in CSV format.
- ACWP stands for Actual Cost of Work Performed, the EVM term for actual costs, a combination of posted and estimated costs.

Actual Cost (ACWP) Transaction File Considerations

- Values are Cumulative-to-Date (CtD) as of the current reporting period. Cobra subtracts the prior period CtD value to arrive at a periodic value. Cobra can accept periodic values, but CtD values are recommended and most commonly implemented since they are, by nature, self correcting.
- Actual Costs are collected in terms of dollars at the Work Package level by Resource Category.
- The link between data in the ACWP Transaction File and the EVM data in Cobra is the Work Package and the Resource Category, referred to as the key fields. Charge numbers associated with Work Packages will not be stored in Cobra.
    - Note there is no technical reason preventing the capture of charge numbers in Cobra should an IO wish to do so.
- The explicit purpose of commas in a CSV file is to delineate data columns. As such, no commas are permitted in a CSV file other than for this purpose.

Resource Category Consideration

The structure of the OOI Implementing Organizations and their Partners requires a hybrid structure to ensure the PMO maintains the ability to distinguish costs by IO and major prime (e.g., Oregon State University & Scripps Institution of Oceanography), in the collection of actual costs by Resource Category. The following structure of nine standard categories must be followed:

Cyberinfrastructure - UCSD	Coastal Global Scale Nodes – OSU
➢ LABOR - CI ➢ FRINGE - CI ➢ INDIRECT - CI ➢ SUBCONTRACTS - CI ➢ CONSULTING - CI ➢ EQUIPMENT - CI ➢ MATERIAL - CI ➢ ODC - CI ➢ TRAVEL - CI	➢ LABOR – OSU ➢ FRINGE - OSU ➢ INDIRECT - OSU ➢ SUBCONTRACTS - OSU ➢ CONSULTING - OSU ➢ EQUIPMENT - OSU ➢ MATERIAL - OSU ➢ ODC - OSU ➢ TRAVEL - OSU
Coastal Global Scale Nodes – SIO	**Coastal Global Scale Nodes – WHOI**
➢ LABOR - SIO ➢ FRINGE - SIO ➢ INDIRECT - SIO ➢ SUBCONTRACTS - SIO ➢ CONSULTING - SIO ➢ EQUIPMENT - SIO ➢ MATERIAL - SIO ➢ ODC - SIO ➢ TRAVEL - SIO	➢ LABOR - WHOI ➢ FRINGE - WHOI ➢ INDIRECT - WHOI ➢ SUBCONTRACTS - WHOI ➢ CONSULTING - WHOI ➢ EQUIPMENT - WHOI ➢ MATERIAL - WHOI ➢ ODC - WHOI ➢ TRAVEL - WHOI
Project Management Office - OL	**Regional Scale Nodes - UW**
➢ LABOR - OL ➢ FRINGE - OL ➢ INDIRECT - OL ➢ SUBCONTRACTS - OL ➢ CONSULTING - OL ➢ EQUIPMENT - OL ➢ MATERIAL - OL ➢ ODC - OL ➢ TRAVEL - OL	➢ LABOR - RSN ➢ FRINGE - RSN ➢ INDIRECT - RSN ➢ SUBCONTRACTS - RSN ➢ CONSULTING - RSN ➢ EQUIPMENT - RSN ➢ MATERIAL - RSN ➢ ODC - RSN ➢ TRAVEL - RSN

Table 6: Organizational Usage of the Resource Categories in Cobra

COBRA Resource Breakdown Structure

A Resource Breakdown Structure similar to the following will be constructed in Cobra to distinguish costs by IO and major prime (e.g., OSU & SIO) and provide the ability to aggregate to the OOI level by the nine standard Resource Categories.

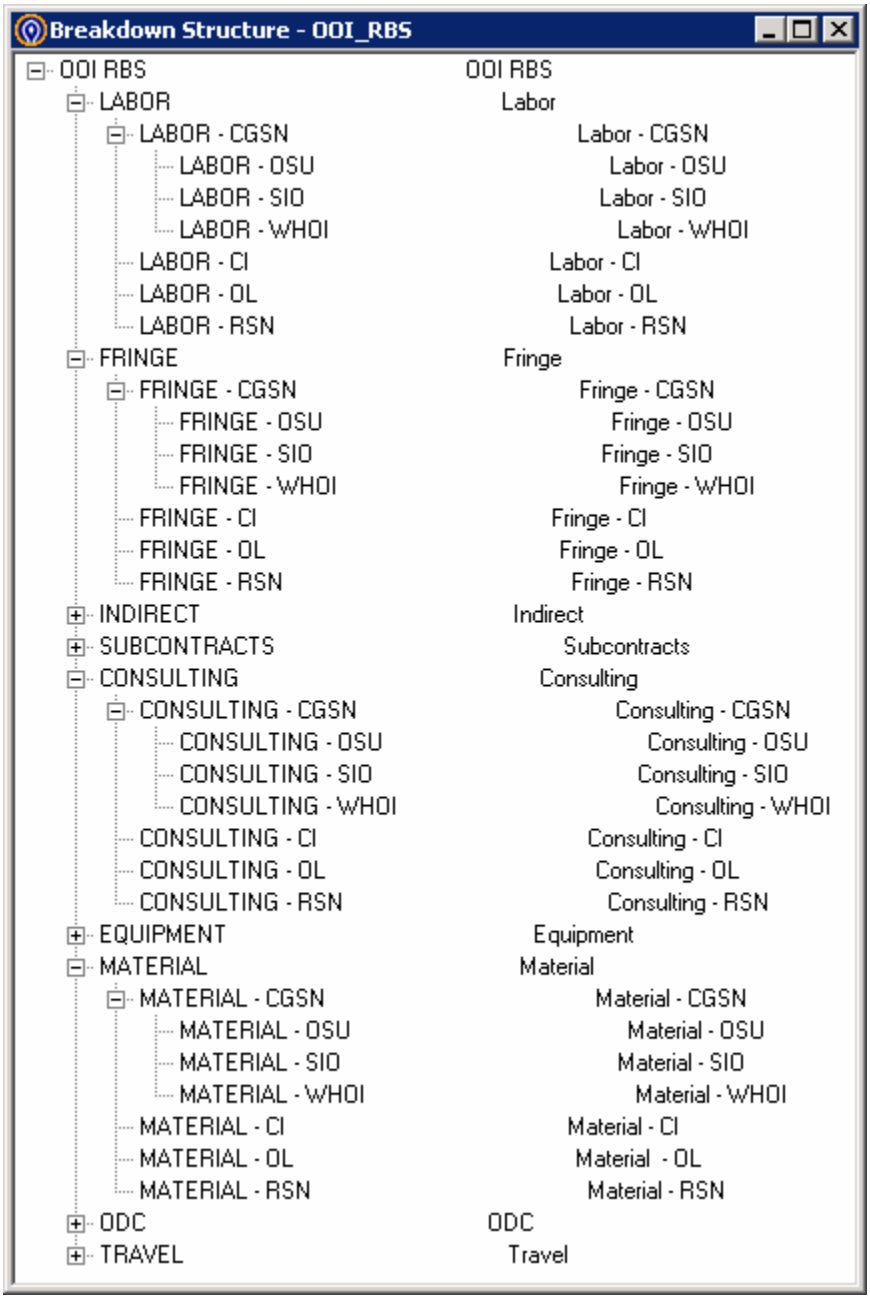


Figure 5: Resource Breakdown Structure in Cobra

Actual Cost (ACWP) Transaction File Example

Following is an example of an Excel spreadsheet that could be saved as a comma separated variable length (CSV) file and imported into Cobra.

Work Package	Resource Category	Cost Date	Cost Class	Dollars
1.4.3.3.1.1	LABOR – RSN	09/30/2009	AC	30000.00
1.4.3.3.1.1	LABOR – RSN	09/30/2009	AE	15000.00
1.4.3.3.1.1	FRINGE – RSN	09/30/2009	AC	18000.00
1.4.3.3.1.1	FRINGE – RSN	09/30/2009	AE	9000.00
1.4.3.3.1.1	INDIRECT – RSN	09/30/2009	AC	6000.00
1.4.3.3.1.1	INDIRECT – RSN	09/30/2009	AE	3000.00
1.4.3.3.1.1	SUBCONTRACTS – RSN	09/30/2009	AC	120000.00
1.4.3.3.1.1	CONSULTING – RSN	09/30/2009	AC	8000.00
1.4.3.3.1.1	EQUIPMENT – RSN	09/30/2009	AC	13000.00
1.4.3.3.1.1	MATERIAL – RSN	09/30/2009	AC	4000.00
1.4.3.3.1.1	ODC – RSN	09/30/2009	AC	3000.00
1.4.3.3.1.1	TRAVEL – RSN	09/30/2009	AC	5400.00

- Work Package

  The Work Package column contains the Work Package WBS code as it is defined both in the Integrated Master Schedule (IMS) and Cobra.

- Resource Category

  The Resource Category column contains one of the nine standard Resource Categories defined in Appendix A-1 appended with the reporting organization as defined on the previous page.

- Cost Date

  The Cost Date column contains the month end closing date of the reporting cycle. This field is optional given Cobra will set it equal to the current status date anyway if it is absent from the file. It is identified as either present in the file or absent from the file at the time of import.

- Cost Class

  The Cost Class column contains a two-character identifier that describes the nature of the cost data. Cost Class is the field by which Cobra distinguishes actual, budgeted, earned and estimate-to complete costs from one another. It also can be used to distinguish posted and estimated costs, colors of budgets and multiple estimates-to-complete from one another.

  Posted and estimated costs are identified by the Cost Classes ‘AC’ and ‘AE’ respectively.

- Dollars

  The Dollar column contains the cumulative-to-date dollars for Work Package / Resource Category / Cost Date / Cost Class combination.

Actual Cost (ACWP) Transaction File Reconciliations

Basic EV practice states that actual costs must appear in the EVMS during the reporting period in which they occur. In particular, subcontract costs must either be associated with the budget in the month that performance is claimed or estimated costs must be used.

How does this work when typical accounting systems run 1-2 months in arrears especially where material and subcontract costs are concerned?

The following simple example illustrates that though EVM distinguishes between posted and estimated costs; both are considered valid ACWP components. The latency associated with most accounting systems is addressed as an adjustment to the estimated costs in the period or periods the actual cost posts.

1. Cost is budgeted for September 2010.

Cost Type	System	Sep10	Oct10	Nov10	Dec10
Budgeted Cost (BCWS)	OOI EVMS	$1,000			
Earned Value (BCWP)	OOI EVMS				
Posted Cost – CtD	IO Accounting System				
Estimated Cost – CtD	IO External Systems				
Total ACWP - CtD	OOI EVMS				

2. Value is earned one month later than planned in October 2010, but the costs have not yet posted. This requires an estimated cost be included in association with the value earned.

Cost Type	System	Sep10	Oct10	Nov10	Dec10
Budgeted Cost (BCWS)	OOI EVMS	$1,000			
Earned Value (BCWP)	OOI EVMS		$1,000		
Posted Cost – CtD	IO Accounting System				
Estimated Cost – CtD	IO External Systems		$990		
Total ACWP - CtD	OOI EVMS		$990		

3. A portion of the actual cost ($465) posts in November 2010. The cumulative estimated cost submitted for that period is $525, or the original estimated cost minus the posted cost.

Cost Type	System	Sep10	Oct10	Nov10	Dec10
Budgeted Cost (BCWS)	OOI EVMS	$1,000			
Earned Value (BCWP)	OOI EVMS		$1,000		
Posted Cost – CtD	IO Accounting System			$465	
Estimated Cost – CtD	IO External Systems		$990	$525	
Total ACWP - CtD	OOI EVMS		$990	$990	

4. The remainder of the actual cost ($499) post in December 2010. The cumulative posted cost submitted is $964. The cumulative estimated cost submitted is $0.

Cost Type	System	Sep10	Oct10	Nov10	Dec10
Budgeted Cost (BCWS)	OOI EVMS	$1,000			
Earned Value (BCWP)	OOI EVMS		$1,000		
Posted Cost – CtD	IO Accounting System			$465	$964
Estimated Cost – CtD	IO External Systems		$990	$525	$0
Total ACWP - CtD	OOI EVMS		$990	$990	$964

Appendix A-3: OOI Labor Hour Reporting Requirement

Reporting labor hours is a project management informational requirement of the project. Each IO is responsible for reporting labor hours to the PMO on a monthly basis no later than 3 business days after submission of the ACWP Transaction file. This reporting requirement is documented herein for simplicity.

OOI Labor Hour Report Example

Following are the Minimum Data Requirement for the monthly OOI Labor Hour Report:

Work Package	Resource Type	Name (Optional)	Period Ending	Current Period Hours	Cumulative to-Date Hours
1.2.2.1.1	UW_APL_CAL_TECH	Lastname, Firstname	09/30/2009	176.00	1408.00
1.2.2.1.1	UW_APL_DOC_SUP	Lastname, Firstname	09/30/2009	176.00	960.00
1.2.2.1.1	UW_APL_SR_SOFT_ENG	Lastname, Firstname	09/30/2009	80.00	640.00
1.2.2.1.1	UW_SCI_TECH	Lastname, Firstname	09/30/2009	128.00	1024.00

- **Work Package** represents the Work Package WBS code as it is defined both in the Integrated Master Schedule (IMS) and Cobra.
- **Resource Type** represents Resource Type as it is defined and used for budgeting in the Integrated Master Schedule (IMS).
- **Name** is the name of the individual project participant to whom the hours apply. This column is optional but will lend itself to summarizing the hours by Resource Type.
- **Period Ending** is the date through which the actual hours are valid. It always aligns with the end of the calendar month. This report is due to the PMO by the end of the following month which allows for the latencies in the different IO specific source systems.
- **Current Period Hours** represents the current period hours for the individual project participant. This number contains the same number of significant digits as the source system.
- **Cumulative To-Date Hours** represents the cumulative-to-date total hours (inclusive of the current period hours) for the individual project participant. This number contains the same number of significant digits as the source system.

OOI Labor Hour Report Considerations

- Each IO will have to build and maintain a crosswalk of individuals to Resource Type to support this report.
- Each IO will have to build and maintain a crosswalk of charge numbers to Work Packages to support of this report.

Appendix A-4 OOI Earned Value Management Reference Material

- Office of Management and Budget (OMB) Circular A-11, Part 7, Planning, Budgeting, Acquisition and Management of Capital Assets:

  http://www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc/

- ANSI/EIA-748-B Earned Value Management Systems (Published June, 2007):

  http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI%2FEIA-748-B

- National Science Foundation Large Facilities Manual – May 2007, NSF 07-38:

  http://www.nsf.gov/pubs/2007/nsf0738/nsf0738.pdf

- Project Management Institute (PMI) Project Management Body of Knowledge (PMBoK) Guide, 4th Edition:

  http://www.pmi.org/Resources/Pages/Library-of-PMI-Global-Standards-Projects.aspx

- Software Engineering Institute: SEI-2005-TN-016, Using Earned Value Management in Spiral Development:

  http://www.sei.cmu.edu/reports/05tn016.pdf

- Defense Acquisition University EVM training center and DAU Gold Card:

  https://acc.dau.mil

- forProject Utilities, Import and Export Tutorial
- Update forProject User Guide
- Deltek Cobra User Guide & Training Materials
- Deltek wInsight User Guide & Training Materials
- Microsoft Project Server Common Fields (CF) document, entitled:

  1020-00001_Scheduling_Common_Fields_Reference_OOI

Appendix A-5 Sample CPR Format 1

Unclassified

CLASSIFICATION *(When filled in)*

COST PERFORMANCE REPORT
FORMAT 1 - WORK BREAKDOWN STRUCTURE **DOLLARS IN:** Ones

Page 1 of 1

1. CONTRACTOR	2. CONTRACT		3. PROGRAM	4. REPORT PERIOD
a. NAME 00	a. NAME Sample Contract Name		a. NAME Government Contract	a. FROM *(CCYYMMDD)* 20021026
b. LOCATION 299 West Hillcrest Dr. Suite 210 Thousand Oaks California 91360 USA	b. NUMBER 11111			b. TO *(CCYYMMDD)* 20021129
	c. TYPE FFP	d. SHARE RATIO 20/80 80/20	b. PHASE [ ] RDT&E [X] PRODUCTION	

5. CONTRACT DATA

a. QUANTITY	b. NEGOTIATED COST	c. EST COST AUTH UNPRICED WORK	d. TARGET PROFIT FEE	e. TARGET PRICE	f. ESTIMATED PRICE	g. CONTRACT CEILING	h. ESTIMATED CONTRACT CEILING
Prod: 21 R&D: 11	$2,300,000	$500,000	$2233 / 17.50%	$3,333	$3,322	$5,555	$8,765

6. ESTIMATED COST AT COMPLETION

	MANAGEMENT ESTIMATE AT COMPLETION (1)	CONTRACT BUDGET BASE (2)	Variance (3)
a. BEST CASE	$1,000,000		
b. WORST CASE	$1,212		
c. MOST LIKELY	$98,764	$2,800,000	$2,701,236

7. AUTHORIZED CONTRACTOR REPRESENTATIVE

a. NAME	b. TITLE
Name of Authorized Rep	Title of Authorized Rep
c. SIGNATURE	d. DATE (CCYYMMDD) 20050126

8. PERFORMANCE DATA

ITEM	CURRENT PERIOD					CUMULATIVE TO DATE					REPROGRAM ADJUSTMENTS		AT COMPLETION		
	BUDGETED COST		ACTUAL COST WORK PERFORMED	VARIANCE		BUDGETED COST		ACTUAL COST WORK PERFORMED	VARIANCE						
	WORK SCHEDULED	WORK PERFORMED		SCHEDULED	COST	WORK SCHEDULED	WORK PERFORMED		SCHEDULED	COST	COST VARIANCE	BUDGET	BUDGETED	ESTIMATED	VARIANCE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
a. WBS ELEMENT															
1100.1 - Design Prototype 2	3,413	874	4,750	-2,539	-3,876	6,006	874	13,350	-5,132	-12,476			8,736	13,350	-4,614
1100.2 - Manufacture Prototype 2	0	0	0	0	0	0	0	0	0	0			515,009	0	515,009
1100.3 - Assemble Prototype 2	0	0	0	0	0	0	0	0	0	0			121,918	0	121,918
1100.4 - Project Oversight 2	25,897	4,821	22,320	-21,076	-17,499	45,578	4,821	42,520	-40,757	-37,699			276,314	42,520	233,794
(OH) - OVERHEAD	28,059	844	28,083	-27,215	-27,239	49,384	844	58,277	-48,540	-57,433			668,838	58,277	610,561
b. COST OF MONEY	0	0	0	0	0	0	0	0	0	0			0	0	0
c. GENERAL & ADMINISTRATIVE	11,933	1,391	11,031	-10,542	-9,640	21,001	1,391	22,829	-19,611	-21,439			342,903	22,829	320,074
d. UNDISTRIBUTED BUDGET													50,000	49,000	1,000
e. SUBTOTAL (Performance Measurement Baseline)	69,301	7,929	66,184	-61,372	-58,255	121,970	7,929	136,977	-114,041	-129,047			1,983,719	185,977	1,797,742
f. MANAGEMENT RESERVE													210,000		
g. TOTAL	69,301	7,929	66,184	-61,372	-58,255	121,970	7,929	136,977	-114,041	-129,047			2,193,719		
9. RECONCILIATION TO CONTRACT BUDGET BASE															
a. VARIANCE ADJUSTMENT									121	1,221					
b. TOTAL CONTRACT VARIANCE									-113,920	-127,826			2,193,719	98,764	2,094,955

Unclassified

CLASSIFICATION *(When filled in)*

Appendix A-6 Sample CPR Format 5

Mostly Harmless

CLASSIFICATION *(When filled in)*

CONTRACT PERFORMANCE REPORT
FORMAT 5 - EXPLANATIONS AND PROBLEM ANALYSIS

Narrative 1 of 9

1. CONTRACTOR	2. CONTRACT		3. PROGRAM	4. REPORT PERIOD
a. NAME 00	**a. NAME** Sample Contract Name		**a. NAME** Government Contract	**a. FROM** *(CCYYMMDD)* 20020928
b. LOCATION 299 West Hillcrest Dr. Suite 210 Thousand Oaks California 91360 USA	**b NUMBER** 11111			**b. TO** *(CCYYMMDD)* 20021025
	c. TYPE FFP	**d. SHARE RATIO** 20/80 80/20	**b. PHASE** RDT&E	X PRODUCTION

5. EVALUATION

WBS Element (1100)

	BCWS	BCWP	ACWP	SCHED-VAR	SPI	SV %	COST-VAR	CPI	CV %
Period Hours	0	0	700	-3,213	0.00	-100%	-700	0.00	-100%
Cum Hours	3,213	0	700	-3,213	0.00	-100%	-700	0.00	-100%
Period $	22,275	0	28,800	-22,275	0.00	-100%	-28,800	0.00	-100%
Cum $	22,275	0	28,800	-22,275	0.00	-100%	-28,800	0.00	-100%

	BAC	EAC	VAC
Hours	324,229	700	323,529
Total $	931,820	28,800	903,020

Cause - Account Val (Per)

The cause of the level 1 threshold variance is the initial values are set incorrectly

Impact - Account Val (Per)

Their is no impact

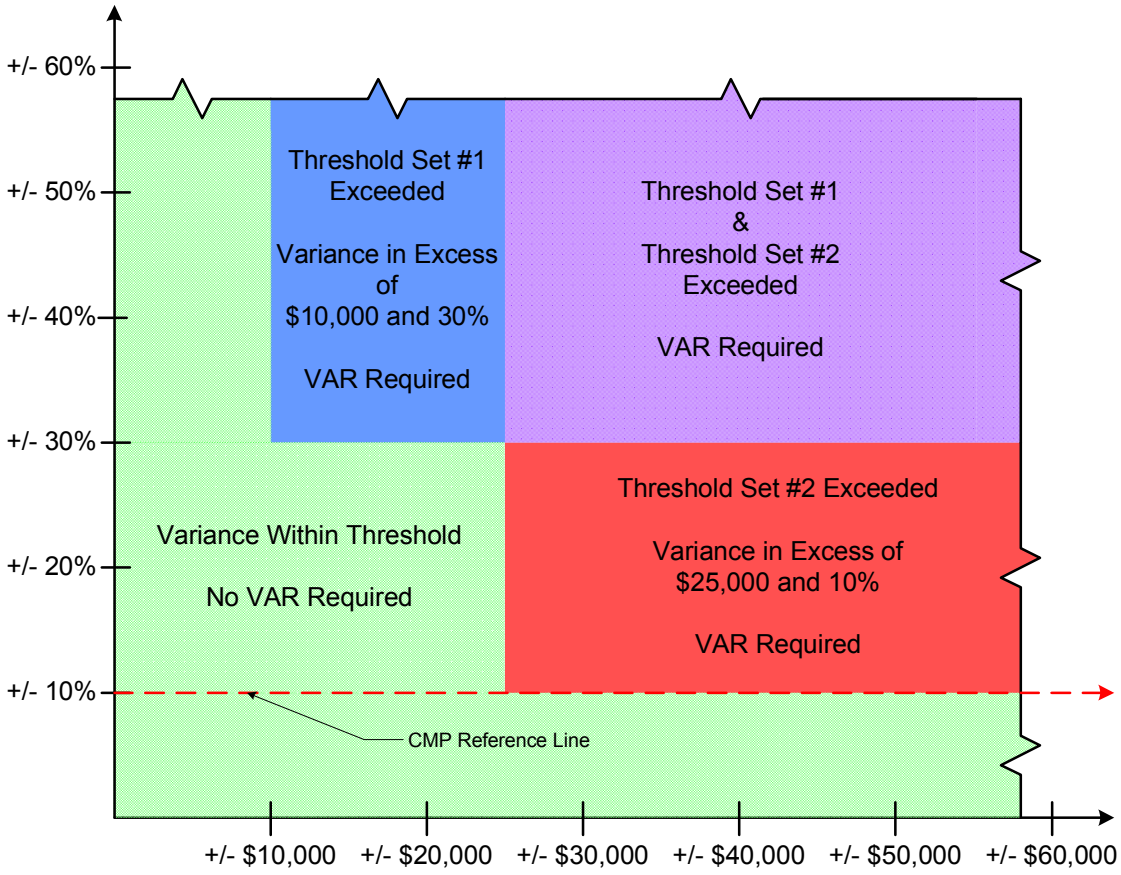
Corrective Action - Account Val (Per)

Level 1 corrective action

Mostly Harmless

CLASSIFICATION *(When filled in)*

Appendix A-7 OOI Program EV Variance Thresholds



Two sets of thresholds have been defined. Both apply at the level of the Control Account. A variance that violates either threshold set results in the need for a Format 5 Variance Analysis Report (VAR). The thresholds apply to the following variances in terms of both Dollars and Percentage.

Variance	Dollars	Percentage
Cumulative-to-Date Schedule	BCWP-BCWS	((BCWP – BCWS) / BCWS) x 100
Cumulative-to-Date Cost	BCWP-ACWP	((BCWP – ACWP) / BCWP) x 100
At Complete	EAC-BAC	((BAC-EAC) / BAC) x 100

Threshold Set #1:

This threshold set is exceeded when a favorable (+) variance is in excess of 30% and $10,000 or an unfavorable (-) variance that is in excess -30% and -$10,000. This method will identify a variance early if it represents a sizable percentage of the Control Account.

Threshold Set #2:

This threshold set is exceeded when a favorable (+) variance is in excess of 10% and $25,000 or an unfavorable (-)variance that is excess -10% and -$25,000.. $25,000 is the dollar threshold for an ECR. The purpose of this threshold set is to flag variances that could result in an ECR when the $25,000 represents at least 10% of the Control Account.